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ANALGESIA AND ANÆSTHESIA IN LABOUR.

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MANY years of experience in obstetric practice have given me the impression that the agony and suffering of women in their first childbirth has no parallel in medicine except in cases of rare devastating disease. It is surprising how little attention has been paid to the possible methods for the relief of pain during labour compared with that shown for surgical operations. Childbirth has always been looked upon as a natural function and our one endeavour is to treat it by nature's methods. But I feel convinced that pain was never meant to accompany the advent of life into the world, and that it is probably one of the penalties of civilization and the mixture of races. Whenever possible, in every case of labour, pain should be eliminated or diminished as far as possible within the limits of safety for the mother and child. The biblical teaching that pain and travail are associated with childbirth since the curse fell in the Garden of Eden, may to some extent account for the apathy on the part of the medical profession in former ages and the resignation of women to their lot. The Church recognizes the dangers as the Prayer Book has always taught us to pray for women labouring with child. No wonder the process is associated with a feeling of fear when it is so well inculcated from youth upwards. When that great pioneer, Sir James Simpson, of Edinburgh, endeavoured to bring relief to women in labour, his strongest opponents were those who brought out their ecclesiasti-

cal arguments. In his researches into the literature of medicine, Sir James could find no reference to remedies for the relief of pain in labour, although frequent references were given for allaying pain in connection with disease. The ancient Greeks had their remedies and many are mentioned in old books, such as the Talmud.

In England and Wales over 3,000 women die every year as the result of childbirth. This is about 32,000 deaths in ten years. This seems an incredible number for what should be a natural process! Apart from deaths due to sepsis, quite a considerable number are predisposed by exhaustion and shock due to the suffering in labour. Syncope is one of the chief causes of sudden death after labour. I am firmly convinced that this is brought about in many of the cases by the ravages of suffering upon the nervous system or to fear on the part of the patient. It is well known that shock has a most important influence upon the result of surgical operations, and much research has been done to not only perfect the administration of anæsthetics but to endeavour to reduce further shock by injections of drugs to deaden the nerves in the operation area. No surgeon would allow a patient to suffer during an operation as the parturient woman is allowed to suffer. For the removal of a tooth most dentists suggest the use of nitrous oxide. A woman held in affectionate regard by her relatives is rarely permitted to endure an ache of any sort without a remedy being immediately suggested. But when the hour of her confinement comes she has to enter into the darkness of anguish and despair and often her only relief is brought about by the hastening of delivery by artificial methods which may endanger the life of herself and of her child. Suffering causes exhaustion and exhaustion is the chief cause of delayed labour and the most frequent indication for the application of forceps. The results of exhaustion may be shock, syncope, P.P.H. and perhaps sepsis. In some cases, suffering brings about acute mental derangement. Puerperal insanity is sometimes recurrent and may be caused by difficulties during labour. In the case of a young woman with unstable nervous system and who has hitherto never experienced pain to any degree, it is not surprising that she should feel the strain of fear and suffering to such an extent as to cause mental derangement, which may be permanent. Women are at last waking up to the fact that all this suffering is unnecessary and can be relieved and they are demanding remedial treatment from their medical attendants. Women of the intellectual classes, having once suffered, cannot be blamed if they are unwilling to repeat the process of childbearing. There is the argument that many women suffer very little and that some isolated cases experience no pain whatsoever. Also we sometimes come across women who wish to remain conscious of the whole process of labour and refuse to be denied any experience of its progress. These women are the exception. The pain of a first labour is the worst pain a human being has to experience, as a rule, and it is only compensated for by the maternal instinct and forgotten in the joy of bringing a life into the world.

The difficulties in the way of relieving pain in obstetrics as compared with surgery, are due to several factors. One is that the pain of labour is so prolonged and may involve many hours or even days. Two lives have also to be considered. Little is known as to the effect of pain-destroying remedies upon the fœtus. Nor is it known accurately how to control the amount of the drug according to its influence upon the fœtus. Some drugs inhibit the uterine contractions and thus cause undue prolongation of labour. Also a patient, in so-called normal labour in domestic practice, has, as a rule, only one medical attendant or a nurse, and the administration of an anæsthetic is looked upon as an additional expense, unless it is given by the doctor himself—a difficult procedure during the actual delivery.

Methods for the Relief of Pain during Labour.

The methods may be divided into two categories:—

(1) Those analgesic drugs which are given mainly in the first stage of labour.

(2) Those anæsthetic inhalations and other analgesic drugs which are administered during the second stage of labour, during delivery or when some operative measures have to be carried out.

(1) *First Stage of Labour.*

The choice of a drug in labour depends upon our experience of what is most suitable for that particular patient, just as it is in surgical practice. Drugs can be given when labour begins, but as a rule, most sedatives are administered when labour has become established and when the patient is beginning to feel some degree of discomfort. Various analgesic drugs are used, and the most important of these are:—

(1) *Opium* usually in the form of some of its derivatives such as morphia, omnopon or heroin. Tincture of opium was given by the mouth in doses of 20 to 25 minims with success in many cases, but it is unpleasant to the taste and sometimes causes nausea. It is now rarely used in obstetric practice.

Morphin sulphate in hypodermic doses of $\frac{1}{6}$ to $\frac{1}{4}$ gr., or better still, omnopon in the same dose, is the most efficacious drug possible. It gives the feeling of most complete rest to the patient. It has little or no inhibitory effect upon the uterine contractions, and it has a marked effect upon the cervix by softening it and causing dilatation with consequent shortening of the first stage.

With such an ideal drug and such easy administration, why is it not universally employed? Because there is an idea that it has a harmful effect upon the fœtus and by causing apnœa at birth it may be fatal in its results. There is no doubt that young children do not take morphin safely, but I have seen no harmful effects of morphin in the first stage of labour when given with care and caution. When given in frequently repeated doses or in large doses, especially if near delivery, it is a dangerous drug.

Morphin—I prefer omnopon—should be given in a dose of $\frac{1}{6}$ gr. when the patient feels the pains are becoming uncomfortable. A second dose of $\frac{1}{6}$ gr. is only repeated when the effects of the first have entirely worn off. Several doses can be repeated according to the character of the labour and the examination of the fœtal heart. In some cases of long labour in primigravidæ I have given omnopon in the second stage with good results, but have been careful not to give it if progress is good and delivery is near. It is seldom necessary to give it in the second stage as other inhalation remedies are preferable.

The influence of morphin is prolonged if given intramuscularly in a solution of 50 per cent. sulphate of magnesium.

It must be remembered that any drug which acts as a sedative to the mother will also act upon the child, and that when born it may be in a state of analgesia or anæsthesia and will require time to recover. Instead of using vigorous methods of artificial respiration in order to make it cry and thus expand its lungs, it should be left at rest and restored by the administration of oxygen (95 per cent.), and carbon dioxide (5 per cent.) under slight pressure to its mouth and nostrils.

(2) *Chloral Hydrate and Potassium Bromide.*—The combination of these drugs or the administration of chloral alone are used fairly widely, especially in hospital practice. A dose of 20 to 30 gr. of chloral to 15 to 20 of bromide is given when labour commences, and repeated at intervals throughout the first stage. A smaller dose of chloral is as a rule given to multiparæ than primiparæ. 15 gr. to 20 gr. may be sufficient at the time with 20 gr. of bromide. It should be taken in about half a pint of warm water and sipped slowly. Some sugar and lemon juice may be added to disguise

the salt taste of the bromide. Chloral hydrate is only depressing in its action if given in large and frequently repeated doses. I have had no experience of its bad effects. In some cases it fails to act. Potassium bromide, if given, may cause gastric irritation from the bromine, therefore it must be taken in dilution.

It is to be noted that there is no definite routine time for the repeated administration of any drug in the first stage of labour. Each case is treated on its own, and the indications are the return of suffering on the part of the patient. Patients differ very much. One dose may be sufficient in one case and half a dozen may be necessary in another, with a prolonged and painful first stage.

(3) *Scopolamine with Morphia* can be given in a modified form from what is known as "Twilight Sleep," where the patient is in a complete condition of amnesia. An initial dose of omnopon or morphin $\frac{1}{6}$ gr. with $\frac{1}{150}$ gr. of scopolamine is given. The dose of scopolamine alone is repeated at varying intervals according to the degree of discomfort experienced by the patient. Small doses of $\frac{1}{250}$ or $\frac{1}{300}$ gr. are useful and just keep the patient free from suffering. This method of administration is easy and can be carried out in domestic practice, and as far as my experience goes, it has been free from risk.

If the condition of amnesia, or *Twilight Sleep*, is desired, then a more elaborate procedure is necessary. The patient must be completely isolated in a darkened and soundproof room. Her eyes must be bandaged if darkness is impossible. A low blue light is very restful in its effect. The ears are plugged, and the attendants must walk on a thick rubber-covered floor. The patient is given one dose of morphin—$\frac{1}{6}$ gr.—and $\frac{1}{150}$ of scopolamine. The latter is repeated in smaller doses whenever the patient can recognize familiar objects which are handed to her. If she cannot recognize an object, such as a brush, she does not require any further dose in the meantime. The condition of amnesia is carried through the second stage of labour and delivery. The object of the treatment is that the patient should have no recollection of anything that occurs whilst she is in the labour room. If she wakens up because of some noise, it is very difficult to get her back to her amnesic condition again. The memory tests are usually carried out about once every hour. Twilight Sleep in many cases gives most satisfactory results. It has been used fairly freely by some obstetricians, after Kroenig and Goss published their results. Why has it been abandoned by some of its former advocates? It is not suitable for private practice, as it requires isolation, absolute quiet, and the constant supervision of the doctor and nurse, who must be skilled in its administration. It is, therefore, expensive in practice. Very few hospitals can give up a suite of rooms for its use. The most usual practice, therefore, is to carry out the treatment in Homes. Because of the commercial attitude of some of these Homes, they have been looked upon askance by the medical profession, and that has done much to prevent the extension of the treatment. Patients have to be chosen, and as some may become noisy and obstreperous under the influence of scopolamine, the treatment has been abandoned in some cases. Some members of the medical profession also believe that it causes apnœa in the newborn. Others say that it is the initial dose of morphin which is the cause. It has again to be noted that the sedative acting on the infant may delay the onset of respiration for a short time after birth, and oxygen and CO_2 should be given. Given the proper conditions, it is a most valuable drug.

(4) *Adaline.*—For some time I and my staff, more especially Miss Beatrice Turner, F.R.C.S., have been trying to find a satisfactory sedative drug for the first stage of labour, and on asking the advice of Sir William Willcox, he suggested adaline. This drug has been in use in the hospital for over a year, and the results are very promising.

A dose of 10 gr. is given, diluted with water, by the mouth. This is repeated as the necessity arises. Sometimes 5 gr. is sufficient. If the dose is too large there is a tendency for uterine contractions to diminish. If the dose is regulated just to keep the patient free from pain, the results are excellent. It does not seem to retard labour, nor has it any ill effects, as far as we can judge, upon the infant. It should be a useful remedy in private practice. Several patients with rather prolonged labours have told us they have no recollection of any pain as long as they were given the drug. The patients seem to have had little exhaustion, and are able to enjoy an ordinary meal within a few hours of delivery.

It is the practice in our obstetric department, when possible, never to let the patients feel afraid, no matter how anxious the medical attendant may be. This psychological precaution has a wonderful effect and prevents a great deal of the shock and exhaustion experienced by many patients after labour. A long labour is not necessarily an exhausting one, but a painful labour, even if brief, may have far-reaching and devastating results.

(2) *The Second Stage of Labour.*

During the second stage of labour, in addition to the pain of uterine contractions and pressure of the presenting parts, there is the stretching and distension of the pelvic tissues. Before delivery, there is the stretching of the perineum, rectum, and vulva, and it is this process which gives rise to such agonizing pain. Finally, during delivery in a primigravida there is frequently the rending asunder of tissues, to varying degrees. If the patient resists and draws up her tissues in order to save herself pain from pressure, she only makes the condition worse by preventing relaxation and causing contraction of the lower parturient canal. The pain and contraction can be eliminated in almost every case if proper methods for the relief of suffering are applied. Although we have mentioned various drugs which are suitable for the first stage of labour, they can all be applied during the second stage and even for delivery, with the exception of morphin. But as a rule, much more satisfactory results are obtained by the administration of intermittent anæsthetic inhalations.

(1) *Nitrous Oxide and Oxygen* is by far the most satisfactory and safest anæsthetic for the second stage of labour, and unless some better substitute is discovered it is the anæsthetic of the future in obstetric practice. It is usually given as a mixture of 80 per cent. oxygen and 20 per cent. nitrous oxide by means of a special inhaler. It should be given just as the uterine contractions are felt by the hand on the abdomen or when indicated by the patient herself. It is continued during the whole contraction, then withheld until the next contraction occurs. It can be given throughout the whole of the second stage, even for three to four hours if necessary. It is given continuously during delivery until the child is born. The nitrous oxide is taken off and pure oxygen given for a few whiffs. This will restore the mother and help respiration on the part of the infant before the cord is severed. It has no effect upon uterine contractions, no effect upon hepatic or renal function, and seems to be the ideal anæsthetic for cardiac and pulmonary complications. It is not extensively used in private practice as it is expensive and it entails the moving about of a cumbersome apparatus. It also means the employment of a skilled anæsthetist. With regard to the latter objection, why should the obstetrician be content with anyone whose main qualification is the possession of a pair of hands to give anæsthetics, while a surgeon refuses to have any but the very best available? It is time that anæsthetics should be put upon a different footing and that a competent anæsthetist should be available in every case where an anæsthetic has to be given, whether for operative measures or for merely the avoidance of a painful delivery. Because the administration of anæsthetics

in obstetric practice is followed rarely by any deaths, we are inclined to belittle the possible dangers. They do happen in isolated cases. Every patient should be exposed to the minimum amount of risk in every direction during labour. An obstetrician who has any regard for asepsis cannot act as anæsthetist and accoucheur at the same moment, and it is not the province of a nurse, in England at least, to give anæsthetics for any surgical procedure. Nitrous oxide and oxygen can be given for induction of labour, version and for the application of forceps. In some cases it may be necessary to give some inhalations of ether in addition, during a difficult delivery or when the blades of the forceps are being applied. Nitrous oxide and oxygen frequently improve uterine contractions and so hasten labour.

(2) *Chloroform* since 1846, when Sir James Simpson published his results, has been used in labour cases. He rejected ether in favour of the newer anæsthetic chloroform. It is safe when skilfully given with a Junker's inhaler and is easy of administration, pleasant and causes little sickness at the time. It should be given during the uterine contractions and withheld in the intervals. A deeper anæsthesia may be necessary when the head is passing over the perineum or when forceps are being applied. Chloroform is much more frequently given in Scotland than in England. The objections to chloroform are that it may paralyse respiration and so become a danger. This rarely happens in obstetric practice. Its chief danger, especially if administered a short time before the onset of labour, say, for induction or for version, or if it is given for a prolonged period of time in labour, is that it may cause disintegration of liver cells and destruction of hepatic function. I have had experience of a case of acute yellow atrophy as a result of prolonged chloroform administration in a patient with slight toxæmia. Chloroform may cause apnœa in the infant. It should only be given in the second stage of labour in intermittent doses and continuously during delivery for as short a time as possible. It is contra-indicated in most cases of eclampsia and toxic conditions. Colon lavage during the puerperium will help in its elimination.

(3) *Ether* is the most extensively used anæsthetic in London at least. It is safe when given by the open mask. It is good in cardiac, renal and septic cases and is said to have less effect on the fœtus than chloroform, nor does it inhibit uterine contractions to the same extent. If given unwarmed, in winter, it may cause bronchial complications.

Anæsthetics are not desirable during the third stage of labour except when repair of the cervix or perineum is necessary, or the rare occasions when a placenta has to be removed by the hand. Uterine contractions are inhibited and post-partum hæmorrhage is liable to occur. Also I have observed that whereas patients take anæsthetics without much risk during labour, there is always a risk of syncope after the uterus has been emptied. This may be due to the fall in blood-pressure and the reduction of intra-abdominal pressure affecting the sympathetic system. Therefore, in all cases of post-partum operative measures, great care should be taken in giving the anæsthetic. It is here that the administration of gas and oxygen is so beneficial. I see nothing but risk in the practice of some obstetricians who give a sedative until uterine contractions almost cease and then administer pituitrin to counteract their effect. Unless great care is taken complications may be liable to occur. Besides the inhalation anæsthetics already mentioned, there are other remedies which may be used for the relief of pain during labour.

(4) *Sacral anæsthesia* has been used of late years and its advocates claim for it many advantages. I have had very little experience of its results so cannot express an authoritative opinion. The injection of

novocain into the sacral canal renders the latter part of the second stage of labour and delivery almost painless and at the same time gives good relaxation of the tissues and so prevents lacerations. It is safe in cases of toxæmia, such as eclampsia, as it has no effect upon renal or hepatic function. It lowers the blood-pressure and intracranial tension and is said not to inhibit uterine contractions. There is less risk of shock or post-partum hæmorrhage and the fœtus seems to be free from any harmful influence. It is used in cases of heart disease and pulmonary tuberculosis. Some obstetricians say that novocain or stovaine injected at the dorsal level, is ideal for Cæsarean section.

It is not in extensive use as it is in surgical work, as it involves a skilled administrator. Also the effect of the injection rarely lasts for more than an hour so that it is only favourable for the last of the second stage and during delivery. In some cases it seems to have only a slight effect.

Of *rectal or synergistic analgesia*, as advocated by Swathmeny I have had no experience. It consists in the intramuscular administration of morphin sulphate $\frac{1}{6}$ gr. early in a solution of 2 c.c. of 50 per cent. magnesium sulphate, followed later by a second or several injections of the magnesium alone. When labour is fully established an injection of 2 oz. of olive oil is passed into the empty rectum and this is followed by a mixture of ether $2\frac{1}{2}$ oz., alcohol 2 oz., quinine hydrobromate 10 to 20 gr. in 4 oz. of olive oil. The patient gets relief from the pain. A second rectal injection of small quantities of ether, alcohol and quinine may be given four hours later, if required. The method seems to be used in some hospitals in the United States and has its advocates. It seems somewhat complicated and difficult to get the patient to retain the fluid in the rectum, even although it is passed up beyond the presenting part of the fœtus.

For *obstetrical operations*, each obstetrician has his own choice of anæsthetics. This subject belongs perhaps to surgery as much as obstetrics. The general rule is that anæsthesia should be as light as possible so as not to interfere with uterine contractions and to prevent P.P.H. taking place.

In conclusion, the best analgesics for the first stage of labour are small doses of morphin or its derivatives, accompanied and later substituted by scopolamine in small doses. Chloral and bromide are most useful drugs. The research already done upon the use of adaline goes to prove that it is a useful and safe sedative in labour. In the second stage of labour nitrous oxide with oxygen is the best anæsthetic to use in every respect. Above all, it must be impressed upon the patient that she is not to feel afraid, but to leave herself entirely in the hands of her medical attendant, who should promise—and carry out this promise—to guard her against all suffering as far as possible within the bounds of safety to herself and her child.

VARIETIES OF SIMPLE AND THYROTOXIC GOITRE AND THEIR DIFFERENTIATION.

By H. GARDINER HILL,
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THE classification of goitre, simple and thyrotoxic, has until recent years been a problem of extreme complexity. Lately there has been a tendency to simplification of terminology. The following classification would now probably meet with more or less general acceptance. The term simple goitre includes (1) diffuse colloid goitre; (2) adeno-parenchymatous goitre; (3) lymph-adenoid goitre; and (4) simple (fœtal) adenoma. The various forms of thyrotoxic goitre, on the other hand, are now classified